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ABSTRACT

Intended for evaluators--whether trainers, psychologists, management consultants or professors--this bibliography samples findings in management training evaluation between 1953 and 1975. It contains 28 abstracts of representative articles from journals in applied psychology and personnel management. Each abstract is a one-half to one-page description of the training program itself, the evaluation design and procedures, and the evaluation findings and implications. Evaluations of training vary by organizational setting, managerial function, topics covered, and instructional strategies. Design characteristics of each evaluation study--namely, type of control, testing schedule, and data categories--are presented in a table to allow the reader to choose a study within his or her own scope of interest. A glossary of evaluation terms is appended. (CP)

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Abstracts of selected MANAGEMENT TRAINING EVALUATIONS

TM007 372

Training Leadership Division

TLP-03-02 (12/77)

ABSTRACTS of SELECTED MANAGEMENT TRAINING EVALUATIONS

Prepared by
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U. S. CIVIL SERVICE COMMISSION
BUREAU OF TRAINING

MARCH 1977

TABLE OF CONTENTS

Introduction i

Characteristics of Evaluation Design ii

Characteristics of Evaluation Design Table iv

Abstracts 1

Glossary 25

Author Index 28

Selected References 29

Bibliography 30

INTRODUCTION

Evaluators—trainers, psychologists, management consultants and professors—have been systematically evaluating management training programs for over twenty years. And, also for over twenty years, evaluators have been publishing articles about their findings. Consequently, a wealth of experience has accumulated from which anyone interested in evaluation can profit.

You may be interested in the evaluation of management training because you are a trainer and want to evaluate courses yourself. You may need to know more about what constitutes good evaluation design. Perhaps you are a manager who must make decisions that are based on evaluations done by others. You may need help in judging evaluations. Whatever the reason for your interest, you may not have the time to read all or even a large share of the articles that two decades of steady work has produced. You need a way of judiciously sampling the field.

We have provided that way by abstracting twenty-eight representative articles. In making our choices, we looked at evaluations of training that varied according to the organizational setting in which the training was given, according to the managerial functions that were being taught, according to the topics that were covered and according to the instructional strategies that were employed.

The table on page iv shows what kind of design was used by each evaluator whose work we have abstracted. Using the table will make it easier for you to find the kind of evaluation that you are interested in. It will also make it easier for you to compare the design of one evaluation with that of another.

This publication includes a list of selected references and a glossary of evaluation terms. Each term that is defined in the glossary is printed in boldface the first time that it appears in each abstract. The only exception to this rule is the term "evaluation," which is not in boldface because it appears as a heading in each abstract.

CHARACTERISTICS OF EVALUATION DESIGN

The table that follows on page iv summarizes each of the evaluations that we have abstracted. It shows the characteristics of the **design** that each evaluator used to gather the information and the types of information that (s)he gathered. (The evaluations are listed chronologically so as to yield a historical perspective and to reveal any trends that may have developed in the last twenty years).

The design characteristics of an evaluation dictate the strategy that the evaluator uses to collect **data.** Did (s)he use a **control group** as well as an **experimental group?** Were the participants picked at **random** or by **matching?** Were they given a **pretest,** a **posttest** or both? The table answers each of these questions for each of the evaluations.

An experimental group is the collection of **subjects** who receive the training. A control group is a collection of individuals who are similar to the subjects in all relevant ways except one: they do not receive the training. An evaluator can use a control group in determining whether the training has affected the experimental group. (S)he tests both groups and compares the results. Presumably any change shown by the experimental group that is not shown by the control group is the result of the training.

The members of the control group should be as much like the members of the experimental group as is possible. Otherwise it would not be reasonable to determine from a comparison of the two groups what the members of the experimental group have gained from the training. For example, suppose that the members of a control group had each worked with the Federal Personnel Manual for ten years. Suppose further that the members of the experimental group had never seen the Manual and that their training consists of a one-week introduction to it. If both groups are tested when the experimental group has completed its training, the experimental group will probably show less knowledge of the Manual than the control group will. Clearly, however, it would be a mistake to deduce that the experimental group has not profited from the training.

To ensure that the members of the control group are similar to the members of the experimental group, the members of both groups are usually picked either by matching or by random selection.

To match is to deliberately pick people for the control group whose backgrounds are the same as those of the members of the experimental group. Background, for this purpose, can be defined as those factors that might influence the experiment: age, status, education, etc. To pick by random selection is to choose participants in such a way that all people who are eligible to be participants have an equal chance of being included. Furthermore, participants must be chosen in a way that ensures that the selection of one participant has no influence on the selection of any other.

If a control group is not used, it is particularly important that the members of the experimental group be picked at random. To understand why, consider how valid an evaluation would be if it were an evaluation of a course that was designed to teach conference leadership and if the course were given to an experimental group composed of participants who had each successfully led several conferences.

As for the characteristic that has to do with pretests and posttests, if an evaluator has given both to the subjects, (s)he has given the subjects the same test twice; once before they start the training, and once after they complete the training. By comparing the results of the pretest to those of the posttest, the evaluator is able to determine whether the subjects have changed during the time between the tests. Changes are presumably the result of the training.

The presence or absence of all of these characteristics influence the accuracy of the evaluation findings. After all, if an evaluation is not well designed, it is possible to ascribe effects to training that are actually caused by other factors. Unfortunately, designing and using an evaluation strategy that incorporates all of these characteristics involves time, money, and planning. Therefore, the designs of many of the evaluations that we have abstracted do not include all of these elements.

The table on page iv also shows what kinds of information were collected in each evaluation. The data is categorized on the table according to the system suggested by Donald Kirkpatrick;[1] that is, under the following headings: **reaction, learning, behavior,** and **results.** Reaction and learning are measured while the participants are being trained. Reaction refers to whether the participants like the training, including the materials, the instructors, the facilities, the methodology, the media and the content. Learning refers to the facts, skills, and attitudes that the participants gain from the training. Behavior and results are measured after the trainees return to their jobs. Behavior means the trainee's performance on the job, and results refers to the impact that his or her training has on the organization.

[1]Kirkpatrick, Donald L. (ED.). **Evaluating Training Programs.** Madison, Wisconsin: American Society for Training and Development, Inc., 1975.

TABLE A: EVALUATION STUDY DESIGN CHARACTERISTICS

Source / Year	Page	Control Group	Type of Control		Measurement		Data Categories			
							Short-Term		Long-Term	
			Random	Matched or Equivalency	Before Trng.	After Trng.	Reaction	Learning	Behavior	Results
Maier (1953)	25	Yes	—[1]	—	No	Yes	No	Yes	No	No
Blocker (1955)	7	No	No	No	No	Yes	No	No	Yes	No
Goodacre (1955)	13	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
Moon & Harriton (1958)	33	Yes	Yes	No	No	Yes	No	No	Yes	No
Vogels (1958)	42	No	No	No	No	Yes	Yes	No	Yes	Yes
Buchanan & Brunstetter (1959)	8	Yes	No	No	No	Yes	No	No	No	Yes
Mahoney, et al (1960)	23	Yes	No	No	Yes	Yes	No	Yes	No	No
Hillman (1962)	17	No	No	No	Yes	Yes	Yes	Yes	No	Yes
Goodacre (1963)	14	Yes	—	—	Yes	Yes	No	Yes	Yes	No
Blake, et al (1964)	5	No	No	No	Yes	Yes	No	No	Yes	Yes
Moffie, et al (1964)	32	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No
McClelland (1965)	28	[2]	No	No	Yes	Yes	No	No	Yes	Yes
Miner (1965)	30	Yes	—	Yes	Yes	Yes	No	Yes	Yes	No
Blake & Mouton (1966)	6	No	No	No	Yes	Yes	No	Yes	No	No
Albanese (1967)	1	Yes	No	Yes	Yes	Yes	No	No	Yes	No
Schwarz, et al (1968)	40	Yes	Yes	No	Yes	Yes	No	No	Yes	No
Valiquet (1968)	40	Yes	No	Yes	No	Yes	No	No	Yes	No
Wilson, et al (1968)	45	Yes	No	No	No	Yes	No	No	Yes	No
Thorley (1969)	39	No	No	No	No	Yes	No	No	Yes	No
Schein (1971)	35	No	No	No	Yes	Yes	No	Yes	No	No
Hand & Slocum (1972)	15	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No
Burgoyne (1973)	9	Yes	No	No	Yes	Yes	No	Yes	No	No
Goldstein, et al (1973)	11	No	No	No	No	Yes	No	No	Yes	Yes
Margulies (1973)	27	Yes	Yes	No	Yes	Yes	No	Yes	No	No
Ashton & Gibbon (1974)	3	No	No	No	Yes	Yes	Yes	No	Yes	No
Ivancevich (1974)	19	Yes	No	Yes	No	Yes	Yes	Yes	No	No
Leidecker & Hall (1974)	21	No	No	No	Yes	Yes	No	Yes	No	No
Wexley & Nemeroff (1975)	43	Yes	Yes	No	No	Yes	No	Yes	Yes	Yes

[1] Dashes (—) indicate that study did not specifically address category.

[2] McClelland reports three studies, one of which has used a matched control group.

Albanese, Robert. A case study of executive development. **Training and Development Journal,** 1967, **21**(1), 28-34.

Albanese, a member of the Ohio State University faculty, evaluated the long term effects of an ongoing executive development program run by the National Restaurant Association (NRA). His evaluation demonstrates how the use of a control group can increase the accuracy of the evaluation results.

TRAINING

The one-week course, given in seven locations in the U.S., covered basic management concepts, improvement of managerial attitudes and behavior, supervisory functions of the manager and standards for restaurant operation. Lectures, informal group discussions, case studies, role playing, question and answer sessions, as well as consultation with faculty members conveyed course content. The trainees in the session which Albanese evaluated, were eleven women and sixty-one men who managed restaurants of various types and sizes.

EVALUATION

Albanese began his evaluation in 1961, three years after the inception of the NRA's management course. He selected a **control group** from the NRA membership catalog. Statistical comparison of background factors showed that the groups did not differ **significantly,** and could therefore be compared on evaluation measures.

Prior to training, managers in both the **experimental** and control groups received five sets of questionnaires with instructions, one to be filled out by the manager and four for his or her subordinates. Subordinates completed the Leadership Description Behavior Questionnaire (LDBQ), a measure of subordinate perception of leadership behavioral style. Managers filled out the Responsibility Authority Delegation (RAD) **scale** which measures these elements for individuals who occupy managerial positions. Only questionnaires returned before the end of the session were included in the analysis.

Finally, six weeks after training, each respondent received a second questionnaire with his or her name typed on it directly. This insured that the designated person received and completed the questionnaire and that the questionnaire could be identified upon its return. Questionnaires returned after the five-week cut-off point were not included in the analysis.

FINDINGS

Managers in the experimental group improved in their perceived ability to take responsibility and delegate authority. Their subordinates also perceived an improvement in managerial use of authority. These improvements, however, were not significantly different from parallel improvements in the control group. Because both groups had an equivalent amount of change, it was impossible to attribute positive effects directly to the training.

Ashton, David and Gibbon, Brian. Evaluating a training program in the probation service. **European Training,** 1974, **3**(1), 62-74.

Ashton and Gibbon apply a mix of formative and summative evaluation techniques to the development of a management course for probation officers.

TRAINING

Beginning in Feburary 1973, an experimental course was run by the Durham University Business School for Probation Officers in the Durham Probation Service. It was the first time that the university had taught management concepts

to a social service department. This type of training within the Probation Service had also previously been limited.

The course objective was to impart an understanding of management concepts and their application within the probation service context. Subject matter was presented by four members of the university staff on the university premises in five one-day sessions, each three to four weeks apart.

EVALUATION

Because this was the first course of its kind conducted by the university, the evaluators selected a strategy which contained elements of **formative** evaluation. They continually gathered information during the development and execution of the course and fed it back to course developers and instructors. In this way evaluators were able to achieve the constant refinement of the course as it evolved.

Prior to training, members of the teaching staff made several visits to the Probation Service Office to look into the organization's problems. In addition, prospective participants were sent a precourse questionnaire asking for their own **criteria** of course success. The responses were analyzed and presented to the teaching staff before the course began. The evaluation function helped in formulating teaching policy at the outset of the program by producing relevant information which changed assumptions made in the early stages of the course's development.

While the course was in session, two instruments were used to gauge participants' perceptions. Session **rating scales** provided an indication of participants' **reactions** to the key dimensions of the course. A session assessment form asked **open-ended** questions about the content of each session and its perceived benefit to the participant. These comments were typed out and presented to the instructors shortly after the end of each session. The information was also fed back to the trainees in the hope that they would find each others' comments valuable and would continue to fill out the forms.

The evaluators, the teaching staff, and the Probation Service Officer jointly formulated the design for a final questionnaire. The main reason for this survey was to obtain feedback on the overall effects of the course, indicating areas of weakness which could be strengthened for subsequent offerings. The questionnaire, sent out three months after the course had ended, elicited primarily personal perceptions from which the value of the course to the organization was inferred. According to Ashton and Gibbon, "At first glance this questionnaire would appear to be a straight forward 'reactions' evaluation tool, but it must be remembered that respondents were the top management strata of the service and hence value to them personally must be aligned with value to the organization."

FINDINGS

Overall, the evaluators found that the information provided by the evaluation effort was of dual benefit. It served to improve the training program during its development, as well as helping to assess the value of the training afterwards. The evaluation was especially useful in designating instructional goals, establishing relevant course content and providing the necessary feedback on course effectiveness.

Through the application of formative evaluation techniques the evaluator, university staff and Probation Officer were able to combine their talents and develop a course which addressed the needs and the interests of their audience.

Blake, Robert, Mounton, Jane S., Barnes, Louis B., and Greiner, Larry. Breakthrough in organization development. **Harvard Business Review**, 1964, 42(6), 133-155.

External consultants, Barnes and Greiner, used a combination of quantitative and qualitative measures to determine the effect of Managerial Grid Training upon organizational effectiveness.

TRAINING

Eight hundred managers in a 4,000 member division of a large petroleum company received Managerial Grid Training, a one-week lab-seminar using problem solving and group discussion techniques and analysis of self assessment ques-

tionnaires. Exercises concentrated on interpersonal relations and setting and achieving goals. Senior line managers served as instructors.

EVALUATION

The evaluation addressed three main objectives: (1) to determine if training in behavioral science concepts could induce organizational change through the behavior of the trained managers; (2) to determine if introspective analysis damages the mental health of trainees; and (3) to assess changes in individual and group behavior. To assess the degree of attainment of the stated objectives, the evaluators used questionnaires, interviews, and observations. Past and present company records were examined in order to separate program from nonprogram effects. The data were collected over a four month period about one year after the first course offering, while the last offering was in progress. The evaluators examined productivity and profit indexes for the periods before and after training. **Post-training** surveys provided information on changes in opinions and attitudes, and interviews and conversation yielded evidence of behavioral changes.

FINDINGS

During the year that the training program was in operation, the company reported a considerable rise in profits and a decline in costs which they claimed were not attributable to price changes in raw materials and finished products or reductions in the labor force. Overall, employee productivity increased without additional investment in plant equipment. Other positive effects demonstrated by the varied measures included a catalog of organizational problems solved during the year, increased frequency of meetings, a change in criteria for management appraisals and a shift towards the 9.9 or high production and high people concern as measured on Blake's Managerial Grid. This study demonstrated that behavioral science concepts can be incorporated into individual behavior, leading to more effective group and, utlimately, organizational functioning, without any adverse effects on employee mental health.

Blake, Robert R., and Mouton, Jane S. Some effects of managerial grid seminar training on union and management attitudes towards supervision. **Journal of Applied Behavioral Science,** 1966, 2(4), 387-400.

Blake and Mouton evaluated the effect of Managerial Grid training on both the production centered orientation of managers and the employee centered orientation of union leaders.

TRAINING

Identical but separate Managerial Grid Seminars were conducted for thirty-three management personnel and for twenty-three union officials, all of whom had management or staff responsibilities within the local. The training experience, relying mainly upon a laboratory format, also featured pre-course readings, organizational and self-assessment instruments and structured learning experiences. The purpose of the Seminars was to aid management personnel and union officials in gaining a fundamental understanding of modern behavioral science concepts concerning sound people-production relationships.

EVALUATION

Measurement for the evaluation was taken both before and after training. To assess both groups' attitudinal changes toward supervisory practices and consequent changes in managerial style, the evaluators used a measure derived from the goals of the Managerial Grid. The forty-item **forced choice** questionnaire assessed beliefs concerning an individual's supervisory practices regarding the integration of people in a production setting. Five distinct managerial styles were noted by the grid approach and measured by the questionnaire: maximum concern for both people and production (9,9), minimum concern for both production and people (1,1), maximum

concern for production and minimum for people (9,1), minimum concern for production and maximum concern for people (1,9), and a balanced, but moderate, concern for both (5,5).

FINDINGS

Initially, managers scored higher than union representatives on the styles having a high production orientation and lower on those with a low people orientation. No differences between groups were found on the moderate style. After Managerial Grid training, both groups showed increased concern for people, but this increase was more marked for the managers.

Blocker, Clyde E. Evaluation of a human relations training course. **Journal of the American Society of Training Directors,** 1955, 9(3), 7-8, 46.

Blocker, a university professor, demonstrates the use of previously collected or historical data to assess the results of a human relations training program.

TRAINING

This study addresses a leadership training program conducted for seventy-eight supervisors from all levels of management of an insurance company. The purpose of the course was to help supervisors understand their personnel responsibilities and give them some techniques which would make their leadership more positive and effective. During ten two-hour sessions spanning an eight-month period, trainees covered supervisory responsibilities, leadership, motivation, employee cooperation, employee attitudes and their effect upon production, counselling, giving orders and discipline. Instructional strategies included selected readings, films, slides, group discussions and role playing.

EVALUATION

The evaluation, which took place after the completion of the training program, overcame some of the problems of using only **posttraining** measurements by using **historical data.** The evaluator selected fifteen of the seventy-eight participants at **random** to take part in the study. Then, based on observation of on-the-job behavior taken during the preceding two years, the selected participants were classified into two groups according to their style of leadership; eight were classified as democratic and seven as authoritarian.

Three months after training, the evaluator examined standard printed interview forms to determine if members of the **sample** had experienced behavioral change. The organization required supervisors to fill out these forms when he/she interviews an employee for any reason. These forms contain the reason for the interview, the attitude of the employee, supervisor's comments and action taken. All forms were classified according to the tone of the interview: threatening interviews were classified as authoritarian; rewarding and constructive ones were seen as democratic. To determine whether any of the fifteen supervisors had changed their behavioral patterns, Blocker compared the pretraining classifications with those derived from the posttraining examination of interview forms. Seventy percent of the previously authoritarian group responded in an authoritarian fashion and eighty percent of the democratic group responded democratically.

FINDINGS

Blocker concluded that the course was unable to overcome natural resistance to change found in supervisors. He stressed the importance of top management support of new policy, and the importance of training on an individual basis.

Buchanan, Paul C., and Brunstetter, Phillip H. A research approach to management improvement: Part I, Part II, **Journal of the American Society for Training Directors,** 1959, **13**(1), 9-8, and **13**(2), 18-27.

In-house investigators, Buchanan and Brunstetter, evaluated a T-group training program to determine its effects upon organizational climate and individual interpersonal behavior.

TRAINING

The three day, two night T-group training program took place at an inn two hours from the work site. Two hundred twenty-four managers from one large department of the Republic Aviation Corp. attended.

The training had two main goals: improving organizational climate with respect to the reward system, role clarity, morale, inter-level communication and employee utilization; and developing individual interpersonal problem solving and behavioral skills. Instructors conveyed course content through small group (9-12) lab-type conferences, supplemented by larger group (12-24) factual lectures.

EVALUATION

Three to seven months after the managers had been trained, they received a questionnaire asking them for a comparison of how things were currently done within their work unit in relation to how they had been done a year ago. The questionnaire, directed at organizational development, required managers to **rate** changes in the effectiveness of various organizational functions. A second group of 133 untrained managers from another departmental unit, acting as a **control** group, also completed the questionnaire.

FINDINGS

The researchers determined which organizational functions were controlled by management and compared the two groups along these dimensions. The trained group reported a greater number of positive changes.

Burgoyne, John G. An action research experiment in the evaluation of a management development course. **Journal of Management Studies,** 1973, **10**(1), 8-14.

Burgoyne tested an action research design in the evaluation of a university-based management training program. This design permits some of the advantages of formative evaluation to be transmitted to an otherwise summative evaluation study.

TRAINING

Burgoyne evaluated a twelve-week management course offered by the Manchester Business School in England and taught by the school's faculty.

EVALUATION

In this study, Burgoyne demonstrates the applicability of an "action research" approach to the evaluation of a management training program. The traditional researcher observes and analyzes the research situation. The action researcher, on the other hand, uses the research findings to bring about change in the research situation and monitors the change brought about by this intervention, which is what Burgoyne did.

The specific action research design employed by Burgoyne is called a "nested" action research **design,** in which the researcher is actually carrying out two independent studies, one of which is "inside" the other. First the researcher observes the research situation and uses his or her observations to influence the situation ("influencing procedure"). In the second phase the "monitoring procedure," the researcher assesses the consequences of change brought about through the intervention. This second study is actually taking place within the framework provided by the first one.

During the first or "influencing" phase of his research Burgoyne chose to study twelve of the thirty-six predefined course segments. He interviewed the faculty members responsible for these segments and used the resulting information to develop instruments which allowed these segments to be compared to future offerings.

During the interviews, faculty members designated objectives and **criterion** measures and projected possible behavior changes which could be expected if their course segment was successful. About half of these instruments included objective **tests.** The instruments were administered both before and after training. The **posttraining** measurement asked, in addition, if participants expected subject matter to influence their work, and if so, would it lead to a demonstrable effect in the organization. Information was fed back to instructors after the session was over for use in the preparation of the next course offering.

The second or "monitoring" phase of the study tested the following **hypothesis**: The impact of the "influencing" research will manifest itself in a greater increase in average participant rating of **learning** for those parts of the course that had been studied than for those parts which had not. When the university repeated the course, nine of the studied course segments and twelve of the unstudied course segments were taught by the instructor who had taught them previously. Participants in both the studied and unstudied groups **rated** perceived change in learning on a seven-point **scale** after they had completed the segment.

FINDINGS

A comparison made between the two groups showed that participants in the studied group reported a **significantly** greater amount of perceived learning, thus proving the stated hypothesis. The success of this evaluation indicates that the action research method has great potential for the improvement of ongoing courses.

Goldstein, Stanley, Gorman, James, and Smith, Blanchard B. A partnership in evaluation. **Training and Development Journal,** 1973, **27**(4), 10-14.

While the "one shot case study" (or single posttraining measurement without control group) is generally considered the least acceptable approach to training evaluation, there are some times when financial, organizational and time constraints prevent the use of more rigorous designs. Goldstein et. al. demonstrate, how under such conditions, evaluators can capitalize on available resources.

TRAINING

In conjunction with a Kepner-Tregoe research associate, a training center director and employee development specialist undertook a study to determine whether Kepner-Tregoe courses had been effective in meeting the needs of the NASA Manned Space Craft Center in Texas. Over a five year period, 300 Manned Space Craft managers attended a total of sixteen offerings of the problem-solving and decision making training course.

EVALUATION

The objectives of the evaluation were to assess course effectiveness, to determine if NASA's investment in the course had paid off in better problem solving, and to find out what levels and types of supervisors would benefit from the course. To gain the answer to these questions, the evaluation team designed a self report questionnaire. After review by NASA executives and pilot testing had been completed, the questionnaire was sent to all 250 former course participants remaining with NASA at the time of the evaluation. The questionnaire included a background sheet, questions emphasizing changes in behavior and job performance, and an optional sheet for noting specific incidents when course concepts had been applied. In addition, the evaluators obtained a measure of **results** by estimating the return on investment attributable to the training program.

FINDINGS

The results of the evaluation were encouraging. Program effectiveness was judged by two criteria: Perceived value and extent of application to the job situation. One half of the respondents reported the course as having significant value. Forty percent reported specific areas of benefit. More than one half reported frequent informal use of course concepts and slightly fewer than half reported repeated formal applications to major job concerns.

In order to get an approximation of return on NASA's investment in the training program, the evaluators compared the cost of the course to the typical manager's annual salary. The course costs, including participant salaries, facility and program expenses equalled about five percent of a manager's annual salary. By contrasting this investment with payoff in terms of perceived growth and performance efficiency attributable to the course, the evaluators estimated that the return on investment had been 200 percent the first year.

Analysis of questionnaire **data** failed to pinpoint a single factor designating those levels and types of supervisors most likely to succeed in applying course concepts to job concerns. The data did, however, suggest that "the more talented employees received greater course benefit." In addition, the application of course techniques to the job depended upon the kind and level of position which the supervisor held and the degree to which his superior and peers supported the use of these new techniques.

The evaluators concluded with a discussion of how course value can be maximized. Supportive organizational factors, application of knowledge on the job, and training employees at a live-in rather than an on-site facility all had an impact on maximimizing course value.

Goodacre, Daniel M. III. Experimental evaluation of training. **Journal of Personnel Administration and Industrial Relations,** 1955, 2(4), 143-149.

In this 1955 article, Goodacre expresses the need for formal evaluation of training by training directors, then demonstrates how to conduct an experimental training evaluation.

TRAINING

The subjects of Goodacre's experimental study were 800 individuals holding diverse managerial and supervisory jobs within the B.F. Goodrich Company. All subjects had been designated as eligible for training. Subjects were **randomly** divided into two groups. One group received training; the second served as a **control.**

The trained group received eighteen ninety-minute sessions designed to improve their knowledge and skills in understanding human behavior, decision making, employee selection, and job evaluation. While the conference method was the dominant instructional method used, some lectures and discussions were included.

EVALUATION

The evaluator measured both groups before and after training. He used attitudinal **scales** to measure the managers' confidence in the application of subject matter areas, their attitudes toward the company, and job satisfaction. Achievement tests measured **learning** in subject matter areas, and supervisory **ratings** measured **behavior** attributable to course and overall job performance.

FINDINGS

In general, the control group did not change on any of the factors measured. The trained group, however, showed improvements in self confidence and learning. The trained group also received slightly higher **posttraining** supervisory performance ratings than the control group, but this difference was not as pronounced as the changes found by the measures of learning. Goodacre concluded by stressing the need for data collection strategies "meeting the conditions of having an adequate **criterion,** controls, statistical analysis and a built-in **experimental design"** in order to "provide management with facts as to the return on its training investment and aid in further program improvement."

Goodacre, Daniel M. III. Stimulating man management. **Personnel Psychology,** 1963, **16**(2), 133-143.

Goodacre shows how several control groups can be employed to test simultaneously the relative effectiveness of several variations of a new training program.

TRAINING

Goodacre assessed a new training program designed to change personnel management practices through a new performance appraisal system. The training program consisted of six ninety-minute sessions during which managers learned and practiced the procedures for the new performance appraisal system. The program concentrated on the application of practices found in "good developers" such as extensive delegation and setting high standards.

EVALUATION

Seven hundred managers in four distinct suborganizations of a large multi-corporation participated in the study. Prior to training, subordinates of managers in all four groups completed a seventeen item questionnaire measuring those practices stated as occurring in "good developers." Three of the groups were then trained while the fourth group served as a **control,** maintaining the traditional trait approach to appraisal used by the company prior to the study.

The three trained groups were used to test the effectiveness of variations in the training program. The first group received training in the new system. They then were allowed to apply it on the job and were given feedback in the form of anonymous employee comments which were culled from the questionnaire which had been administered to subordinates. After the feedback session they received additional training. The second group received the same treatment as group one, but did not receive the additional training. The third group received no feedback, only the initial training in the use of the system.

FINDINGS

The greatest number of changes, as Goodacre expected, were recorded in the first group. The control group, however, was a close second due to an unplanned occurrence—increased union pressure upon management to conduct performance appraisals and supply feedback annually. Union membership in the control group was high in comparison to the three trained groups (72% against 19%, 16% and 23%).

Even though the **data** showed that personnel management practices could be changed through a program of training and new administrative procedures, Goodacre was not able to isolate the differential effects of the new program because of the unplanned occurrences in the control group.

Hand, Herbert H. and Slocum, John W. A longitudinal study of the effects of a human relations program on managerial effectiveness. **Journal of Applied Psychology,** 1972, **56**(5), 412-417.

The authors conducted this study to determine if a managerial human relations training course could change attitudes, and whether these new attitudes were reflected in organizational effectiveness. This article reports on the second phase of an evaluation two years after training. The first phase, done ninety days after training, reported no significant attitudinal or behavioral changes.

TRAINING

A packaged course was conducted by the Continuing Education Division of a major eastern university for a specialty steel plant in central Pennsylvania. The training provided practical application of human relations principles through problem solving methods. The "off the shelf" or standardized package program used, consisted of a total of nine hours of discussion of managerial styles and a total of thirty hours of experimental learning experiences using individual and group exercises, self assessment devices and simula-

tions. A third segment of the course provided a total of three hours of instruction on current motivation theory. Training was accomplished during twenty-eight ninety minute sessions, beginning in September, 1968 and continuing through March, 1969.

EVALUATION

The evaluators, who were members of the university staff, used a **pretest-posttest** strategy to measure changes in behavior, attitudes and job performance. Twenty-one trained managers and twenty-one **controls** were **randomly** selected from the same hierarchical level of the organization to participate in the study. A statistical comparison of corporate demographic factors, such as position in the hierarchy, time in present position and educational level, insured comparability of the two groups.

Measurements were taken prior to training, ninety days after the **experimental** group had been trained and again fifteen months later. During each testing, managers in the experimental and control groups completed the Leadership Opinion Questionnaire, a measurement of leadership attitudes concerning work environment and task performance. Simultaneously, their subordinates received the Supervisory Behavior Description, a companion instrument which provided subordinate measurements of the same leadership qualities. At the same time, their superiors completed a job performance **scale** developed by the corporation's Director of Training. The traits **rated** by this instrument were technical knowledge, functional knowledge, drive/agressiveness, reliability, cooperation and organizing ability.

FINDINGS

The evaluators found that managers in the control group described themselves as becoming more impersonal and production centered; their subordinates also described them as moving away from concern for human relations in the task environment. Evaluators noted a mirror image change in the trained group. **Significant** attitude and performance changes surfaced. Members of the trained group developed more positive attitudes toward the human relations aspect of their jobs, and these attitudes led to positive changes in job performance.

Since the researchers had anticipated significant change in the experimental group only, they speculated upon possible explanations for the unexpected change in the control group. A likely explanation was proposed. Noticing that the trained managers enjoyed greater success with peers and subordinates and greater job effectiveness, the control group managers reacted by applying a more autocratic, structured approach, one which they had found successful in the firm in the past. Increased managerial control could have in turn adversely effected subordinate performance, which was ultimately reflected in decreased managerial effectiveness. Without pre- and posttraining measures this phenomenon might have remained unnoticed.

Hillman, Harry. Measuring management training, a case study. **Training Directors Journal,** 1962, **16**(3), 27-31.

Hillman studied a training program designed to foster uniform personnel policies within a large, rapidly expanding multiple organization, and to improve the skills of its managers in interpersonal relations.

TRAINING

A training program was proposed to eliminate the widespread inability of managers to manage. Through training, the organization hoped to reduce employee turnover and absenteeism, improve operating efficiency, improve safety and reduce Workmen's Compensation costs, improve employee morale and attitudes, and retard growth of union representation.

The resulting three-day training program covered: management responsibilities for planning, organizing, communications, supervision and controlling; selection, indoctrination and training of employees; methods improvement; handling personnel problem cases; safety; and human relations. A team of two headquarter managers and a selected local manager served as instructors. Course developers employed the confer-

ence technique supplemented by actual case problems, role plays, visual aids and films. The trainees were branch managers within the firm.

EVALUATION

To determine whether the goals of training had been met, the evaluators employed a test of classroom **learning,** measured trainee **reactions** to course and instructor, and assessed impact of training on the organization. "How Supervise," a published questionnaire measuring changes in the participant's thinking about supervisory practices, policies and opinions, was administered at the beginning and end of the course to obtain a measure of classroom learning. After each session, participants anonomously completed a five-point **rating scale** measuring their reactions to each conference leader's effectiveness and the interest value, usefulness and potential for application of each subject. Once the trainees had returned to their jobs, monitoring of turnover, absenteeism, accident frequency, Workmen's Compensation costs and union gains provided a measure of the impact of training upon the organization.

FINDINGS

The evaluators decided to discontinue the use of "How Supervise" after consistently favorable results were obtained from nine consecutive course offerings. At that point they were satisfied that the course was able to transmit learning in the classroom setting.

Overall, ratings obtained from the reaction scale were generally high but conference leaders using the lecture approach received somewhat lower ratings. When asked for their views, however, participants expressed the view that basic qualities of common sense and understanding of people could not be taught by this type of training program.

The payoffs of this training program to the organization were high. Turnover dropped thirty percent, accidents decreased by fifty percent, and Workmen's Compensation costs were substantially lower. Union activity virtually stopped, an outcome desired by the organization's top management.

Ivancevich, John M. A study of a cognitive training program: Trainer styles and group development. **Academy of Management Journal,** 1974, 17(3), 428-439.

Ivancevich examined the effects that varying the role of the instructor had upon participant groups during training.

TRAINING

A five-day management and organizational behavior training program served as the stage for Ivancevich's experiment. The course was designed to teach conceptual knowledge to first level management within a multi-plant manufacturing company. Text articles, role plays, a communication exercise and questionnaire were used to teach motivation, group functioning, leadership, organizational change, behavioral science, organization, and company trends. Sixty-four first level managers attended.

EVALUATION

Ivancevich explored the effect of two contrasting trainer styles on group development. He **hypothesized** that he would find **statistically significant** differences between the two groups in group cohesion, interparticipant conflict, openess of communication, perceived interpretations of positive productivity and participant attitudes toward training.

With the help of the company's Vice President of Production, the Director of Industrial Relations and the Assistant Director of Industrial Relations, Ivancevich assigned the sixty-four managers to two **matched** groups in which members were not well acquainted with each other. The managers were matched with respect to age, education level, tenure, and salary rates.

Both groups covered the same topics, received identical instructional and reading materials and

had the same trainer. The difference rested in the role played by the trainer. In one group, "training group structured," the trainer lectured at the beginning of each of the eight modules and specified what the learning expectations were and how they would be accomplished. The trainer played an active and directive role. He provided reinforcement for good ideas and suggestions, gave immediate, constructive feedback on completed tasks, and felt free to openly disagree with participants. The time spent on all activities was closely controlled. In the other group, "training group with minimum structure," the trainer played a facilitative role. He held lecturing to a minimum and presented his thoughts and ideas via the chalkboard. He expressed opinions only when asked and avoided disagreements with participants. The group freely discussed whatever ideas and issues they wished to be clarified. The trainer provided a minimum of feedback and reinforcement, and exerted no control over the sequence of and time spent on instructional and reading materials.

After each module participants completed a fifty item **rating scale** measuring attitudes toward group cohesion, interparticipant conflict, openess of communication, productivity of module session, and attitude towards trainer. The evaluator traced and examined changes in the development of both groups for each individual module.

FINDINGS

For the most part, the structured training approach was proven to be more effective. This group experienced more statistically significant improvements or group development in the areas of group cohesion, openess of communication, productivity and attitude toward the trainer.

Leidecker, Joel K., and Hall, James L. The impact of management development programs on attitude formation. **Personnel Journal,** 1974, 53(7), 507-512.

Emulating an earlier study, the authors set out to measure the impact of an ongoing management development program on participants' attitudes and values. Their results pointed to new directions for management development programs.

TRAINING

Leidecker and Hall studied a ten-week management development program at the Santa Clara Center for Leadership Development. The **subjects** of this study were drawn from the participants in these programs beginning with the academic year 1971-72 and continuing into the academic year of 1972-73. The participants, who were middle managers from diverse kinds of firms in the San Francisco Bay area, ranged in age from their twenties to their fifties, with the majority in their thirties and forties.

EVALUATION

Through their research, the evaluators wanted both to measure the impact of this program on participants' attitudes and values and to compare their findings to a similar study done seven years earlier by Schein.[1] Two instruments were used to collect the necessary **data.** The first, the Public Opinion Questionnaire, which consisted of a series of attitude and value statements, determined participants' positions on five dimensions: business and society, general cynicism, management theories and attitudes, attitudes towards people and groups, and individual and organizational relationships. Participants completed it before and after training. A second instrument, an adaption of the Profile of Organizational Characteristics, determined whether the participant's organization was "highly supportive" or "less supportive." Administered before training only, its use was to gauge the relationship between organizational climate and permanence of participant's change, if any.

FINDINGS

Managers in the present study overwhelmingly (90%) responded that they had faith in their workers. On this basis, the evaluators suggested that future training in the areas of Participative

Management, Human Relations and Job Enrichment should concentrate on developing the skills of application rather than teaching the importance of these concepts.

The evaluators also found strong support for the principle of supportive relationships. The processes within the organization were no longer viewed as dehumanizing. Rather, the experiences provided by the organization were seen as supportive to the individual, and ones which build a sense of personal worth and importance. The strength of this commitment, lacking in a previous study,[2] indicated that managers had now adopted the necessary attitudes to change the organizational relationships. The focus of training programs should, therefore, shift from attitude change to concept application.

The evaluators compared the present study's results with a similar one done by Schein in 1967. Schein had studied a twelve-month management education program conducted at M.I.T. The evaluators found that present participants possessed more positive attitudes toward corporate responsibility than the earlier group. Furthermore, attitudes of present subjects shifted positively in this area, a change not noted in the Schein study. This implies greater receptivity of subjects to training programs emphasizing corporate responsibility and social awareness.

[1]Schein, Edgar H. Attitude change during management education. **Administrative Science Quarterly**, 1967, 11(4), 601-628.

[2]Ibid.

McClelland, D. Achievement motivation can be developed. **Harvard Business Review**. 1965, **43**(6), 6-24, 178.

McClelland describes and evaluates his approach to developing entrepreneurial traits in managers.

TRAINING

McClelland reports on three studies of his own development program which was aimed at teaching participants how to improve their performance as entrepreneurs. One study took place in the U.S., the others in India. In all programs, participants were taught about McClelland's concept of need achievement (n-ach), its importance to entrepreneurs, and how to act and perceive the world like a "hi n-ach" (a person who is highly motivated by the need to achieve success)

He employs four main training methods: (1) Goal Setting—trainees set goals which are then used as a target against which they can evaluate their progress. Every six months for two years participants fill out a report form. This record keeping process keeps the goal salient. (2) Language of Achievement—the trainee learns to code his/her thoughts or fantasies and talk in terms of "hi n-ach" concepts. This in turn influences behavior. (3) Cognitive Supports—the person must re-examine pre-existing attitudes, values and self-concepts and reconcile them with this new way of thinking and acting. (4) Group Supports—instructors and peers provide emotional support.

EVALUATION

In order to determine whether or not his course had been effective, McClelland compared participants' **pretraining** level of entrepreneurial activity to the level exhibited once they had returned to their jobs. Increased entreprenurial activity was defined as observable acts such as advancement within the organization, or an increase in the size or scope of one's own business.

APPLICATIONS

McClelland describes three applications of his training program. The following brief summaries address the programs and their findings.

Study I

A pilot study conducted at a large U.S. corporation involved sixteen executives in a one-week training session. Participants were **matched** to a **control** group on the basis of length of service, age, job type and salary level. Two years later

McClelland conducted a follow-up study to find out which group of men had done better subsequent to training. On the average, those who had attended McClelland's course had been promoted faster than their matched controls.

Study II

The second study, done in India, evaluated a similar training program conducted at the Small Industries Extension Training Institute. Fifty-two Indians from several communities attended the ten-day residential seminar. The men were heads of small businesses, lawyers, bankers and politicians. Trainees participated in individual and group sessions, analyzed their self concepts based on psychological test data and learned the language of achievement (positive thinking) and how to set goals. A follow-up period of six to ten months ensued.

During the follow-up period, the trainees doubled their entrepeneurial rate. Before training one third of the group had been unusually active, the number increased to two thirds with training. The judgment was based on observable acts such as expanding an old business, increasing profit or investigating a new product line.

Study III

A third study of thirty-two salaried executives from a variety of firms in Bombay replicated these results. Before the course only about twenty to thirty percent of the men were "quite active." A follow-up conducted two years after training revealed that two thirds of the men who had attended the course were now "unusually active."

Mahoney, Thomas A., Jerdee, Thomas H., and Korman, Abraham. An experimental evaluation of management training. **Personnel Psychology**, 1960, **13**(1), 81-98.

Mahoney, Jerdee and Korman used a multi-group experimental design to evaluate the overall effectiveness of a managerial training program and the relative effectiveness of two types of case studies.

TRAINING

The goals of the on-going program were to develop within top and subordinate levels of management a knowledge and understanding of management principles, to develop the ability to apply a special approach to problem-solving and to increase personal responsibility for self development. The instructional techniques used to achieve these objectives were case analysis and group discussion supplemented by reading assignments and lectures. Two approaches to case analysis were used. Some trainees received the standard case approach while others received the "boss involved" approach. The latter approach requires all participants to meet with their respective superiors prior to training in order to select a problem encountered by participants in their work. The participant then analyzes the problem, prepares a solution and reports back to the superior after training. The instructor selects one such problem for class discussion. The week long course took place at non-residential facilities near the work site. Trainees were sixty-four second level managers from one division of a large company.

EVALUATION

To determine whether either case approach was superior in achieving course objectives the evaluators compared participants trained using each case approach to participants who had not as yet been trained. The evaluators assigned the managers to five groups, attempting to provide a mix of the different functional responsibilities within each group so that managers could share experiences and learn from one another. Careful scheduling of course sessions enabled the evaluators to have a **control** group.

The first step was to test participants on three **criterion** measures before any training began. The "Management Practices Quiz" was developed based on course materials to test knowledge of concepts and principles presented in the course. A standard scoring procedure enabled the use of sample case studies to assess problem solving ability. A third measure, an attitudinal

scale, was developed to measure responsibility for self development.

After the **pretest** was completed, two instructors taught two sessions simultaneously. Instructor I taught Group I using the "boss involved" approach; Instructor II used the standard approach with Group II. Then the instructors taught two more sessions simultaneously, this time Instructor I used the standard case approach and Instructor II used the "boss involved" approach. Instructors I and II taught Groups III and IV, respectively.

A **posttest** using the same three criterion measures was then administered to all five groups. Group V, serving as a control group, received training after the experiment ended.

FINDINGS

Although the trainees showed no **significant** improvement on the test of knowledge, significant improvement surfaced on the attitudinal measure and on one scale of the case study. In seeking a possible explanation to the results, the evaluators compared the participants' scores on the criterion measures to those of the instructors, who had attended an earlier course offering. In general, the instructors scored no higher after the course than the participants had scored before training; this suggests that either the instructors were not adequately prepared or the criterion measures were not relevant criteria for the evaluation of the course.

Analysis also showed no difference between the "boss involved" approach and the traditional approach in the achievement of training objectives. No conclusion can be drawn, however, because participant comments indicated that, in many instances, the procedures in the "boss involved" approach had not been followed.

Maier, Norman R.F. An experimental test of the effect of training on discussion leaderhip. **Human Relations,** 1953, 6(2), 161-173.

Maier set up an experiment to determine if supervisors could be trained to use a permissive approach in discussion leaderhip.

TRAINING

An eight hour training course was designed to present the nature of group decision-making and how it can be adapted to dealing with job problems. The instructional methods used were lecture, group discussion, and role playing. During a four-hour discussion period, trainees asked questions and expressed their opinions and attitudes. The role playing problem which followed allowed the trainees to apply their new knowledge and allowed the evaluator to test the trainees' **learning.** In the problem, a foreman had to convince three employees to change their job tasks.

EVALUATION

To determine whether the training program had produced a change in learning, Maier compared trainee performance on the role play exercise to performance of untrained managers. Instead of training, managers in the **control group** received a one-half hour lecture on resistance to change which served to introduce the role play. In all, forty-four groups of trained managers and thirty-six groups of controls performed the role play. Each of these groups had four members, one to play each role mentioned above. By using large numbers of role playing groups for both **experimental** and control conditions, Maier hoped to overcome some of the bias which individual personalities introduce into the role play setting. By having many groups the effects of individual personalities cancel each other out.

FINDINGS

The trained leaders were more effective in bringing about change than their untrained counterparts. Fifty percent of the control group and fifty-nine percent of the experimental group "accepted change" in the problem setting. Fifty percent of the control group "rejected change." In the experimental group, however, 36.4 per-

cent accepted compromise and only 4.5 percent rejected change.

A basic difference was found between the two groups. Untrained leaders attempted to force change by using money. Trained leaders viewed the situation as a problem to be solved by the group and tended to be more considerate, tolerant and open to suggestions.

The evaluator concluded that the eight-hour course was sufficient to cause behavioral change in the classroom setting. However, higher management support was felt to be necessary if the new behaviors were to transfer to the job setting.

Margulies, Newton, The effects of an organizational sensitivity training program on a measure of self actualization. **Studies in Personnel Psychology** (Canada), 1973, 5(2), 67-74.

The objective of this evaluation was to determine whether or not an extended sensitivity training program which provides the opportunity for reinforced practice of learning increases the ability of the T-group experience to develop self actualization in managers.

TRAINING

Margulies studied a T-group based managerial training program conducted for middle managers in a large company. This particular sensitivity training program differed from the usual week-long approach in that training sessions extended over a four-month period and specific sessions were devoted to the transfer of learning to the job. Margulies wanted to determine if this approach could produce changes in the degree of self actualization of participants. Fifty middle managers were selected to participate in the comparison on the basis of interest, ability to benefit from the program and lack of interference from job tension upon participation in the program.

EVALUATION

Margulies **hypothesized** that the provision of explicit application opportunities would be reflected in the psychological growth of the participants. To test this, he exposed participants to different program variations, testing them before and after training on a measure of self actualization.

To test his hypothesis, Margulies used a **control-group pretest-posttest design.** Participants were **randomly** assigned to five equal size groups. Four groups received training. The fifth group, serving as a control group, was told that due to the large number of participants it was necessary to include them in a sensitivity training program planned to be held several months later.

Trainees attended a three-hour session each week and one full weekend session per month over a four-month period. One of the trained groups was a "pure" T-group in which instructors made no attempt to link training to job experiences. The other three trained groups had specific sessions devoted to practice of specific day to day "applications" and reinforcement of learning.

The Personal Orientation Inventory, (POI) a measure of self actualization, was administered to all five groups in an orientation session before the program started, and again, once training had ended. The self actualizating person is one who functions in the present, becoming more aware of his or her own personal attributes and potential, and better able to top that potential. The POI measured self actualization by assesing Inner Directedness, or whether the individual was motivated by self or other; and Time Competence, or the individual's ability to function in the present rather than the past or the future.

FINDINGS

The three trained groups did **significantly** better on the posttraining measure than the untrained control. Groups had not differed significantly on the pretraining measure. The results affirmed the value of training in increasing managers ability to self actualize.

Further analysis showed that the improvements made by the "applications" groups were signifi-

cantly greater than those of the "pure" group. The "pure" group made gains only on the Inner Directedness measure, while the "applications" group gained on both.

Miner, John B. **Studies in Management Education.** New York: Springer, 1965.

Miner addressed the question of whether motives of management can be changed in the direction of greater effectiveness and if this change could be induced through training.

TRAINING

Miner presented his training course to research and development managers who were spending nearly all their time on research and development activities and little time in fulfilling their managerial responsibilities. Initially the course concentrated on reasons for ineffective subordinate performance, shifting in later sessions to the ineffective manager. Reasons for ineffective performance were presented in light of psychological and sociological theory with frequent referrals to research findings in those areas.

Training was given during ten ninety-minute sessions, conducted at weekly intervals. Miner taught four groups, roughly equivalent in size, primarily using the lecture method with some discussion when questions arose. Typically, small group discussion followed the lectures.

EVALUATION

Miner used a **pretest-posttest control group design** to evaluate the effects of training. He administered the Miner Sentence Completion Test (MCAT) to seventy-two trainees and a control group of thirty managers in the same work unit who did not attend the course. The MCAT uses the sentence completion format to measure managerial attitudes toward various aspects of the managerial role. Both groups filled out the MCAT during the first week of training and again once training had been completed.

FINDINGS

On the posttest, fifty-nine percent of the **experimental** group inproved, twenty percent made no change and twenty-one percent dropped in score. Miner felt that this decrease was not due to the training, instead attributing it to external factors. A similar decrease in the control group supported his opinion that organizational change had been the cause.

Follow-up Study

Miner conducted a follow-up using job related **criteria** instead of the questionnaire. Fifty-two managers who took the course were compared to forty-nine untrained managers. Both groups were equivalent in salary and grade level at the time of training. Performance appraisal data indicated that both groups were fairly well **matched**.

An examination of posttraining promotion records for those remaining with the company during follow-up, showed the experimental group **significantly** superior. Within the experimental group eighty-six percent had at least one promotion, while only fifty-six percent of the control group experienced the same progression. Miner also examined rehiring recommendations for those who left the company during the follow-up period. Only thirty percent of the controls, as compared to sixty-nine percent of the experimental **subjects** who separated, did so with a statement in their files indicating that their superiors were sorry to let them go.

Moffie, Dannie J., Calhoon, Richard, and O'Brien, James. Evaluation of a management development program. **Personnel Psychology,** 1964, 17(4), 431-440.

Moffie, Calhoon and O'Brien conducted a study demonstrating the need for more than one measure of course effectiveness.

TRAINING

The consulting firm of Kepner-Tregoe and Associates Inc. provided their problem solving and decision-making course to the top three levels of managerial personnel of a large southeastern papermill. The course lasted a total of twenty hours.

EVALUATION

The evaluators collected three distinct types of **data,** all of which were considered in the final decision to retain the course: (1) a course-end questionnaire obtained trainee **reactions** to the program: trainees were asked for their opinions on the extent to which the course met its objectives, how the program related to their job related problems and how the program might be improved; (2) observers recorded the behavior of participants during practical work periods into pre-established categories in order to determine the effects of training on interpersonal relationships; (3) an **experimental** evaluation was conducted to determine the effect of training on **learning.** Trainees and a second group of managers from another mill, **matched** on the basis of biographical and psychological test data, received **pre-** and **post course** measures. These included the Watson-Glaser Critical Thinking Appraisal, a standardized test measuring the ability to logically organize and analyze problems, and pre- and posttraining case problems developed by the consulting firm.

FINDINGS

The evaluators found no **statistically significant** difference between the trained group and the **control** group on the experimental measures. They found, however, that the trainees thought the program to be worthwhile and were applying the techniques taught in the course to day to day manufacturing problems. They concluded by reporting that "Management plans to continue use of the training program in view of the fact that in specific situations the techniques learned in the course appear to be beneficial in the solution of every day manufacturing problems."

Moon, C.G., and Hariton, Theodore. Evaluating an appraisal and feedback training program. **Personnel,** 1958, 35(3), 36-41.

Moon and Hariton demonstrate that meaningful results can be obtained from relatively simple measuring methods.

TRAINING

In the spring of 1956, the Engineering Section of a department of the General Electric Company installed a new appraisal and personnel development program. The new program featured a revised performance appraisal system and a thirty-hour course teaching line managers to use appraisal information in helping subordinates develop themselves. The program stressed both the essential principles and interviewing skills necessary to feed back appraisal results in a manner designed to stimulate employee growth and development. Fifty managers attended half-day sessions conducted in-house for a period of two weeks. During these sessions, they received lectures and participated in a discussion and a role play.

EVALUATION

Two years after the adoption of the new appraisal system a decision was made to evaluate its effectiveness. A consultant from the Educational Testing Service and an in-house evaluator joined forces to determine the effects of a new apprais-

al and a personnel development program. Questionnaires were sent to sixty-six randomly selected employees in the Engineering Section and a control group of sixty-seven employees in the company's Manufacturing Section. The latter group had used a different appraisal system and their managers had received no training in feedback techniques. The questionnaire asked subordinates for their opinions concerning changes in their superior's job behavior and attitudes. Ten dimensions of effective supervision were assessed by the posttraining measure. Managers who attended training also received a questionnaire at this time asking their views about how they themselves had changed.

FINDINGS

Subordinates in both the experimental and the control groups expressed that an overall improvement in their managers' behavior and attitudes had occurred as compared to two years ago. The experimental group perceived their superiors significantly higher than the controls on eight out of ten dimensions. The greatest differences in perceptions fell in the areas of giving recognition for good work, providing opportunity for subordinates to express their viewpoints, and expressing concern for their employees' futures - gains clearly attributable to the training. In addition, the course participants reported that they felt it easier to talk to their employees about job problems, and were able to suggest solutions. On the other hand, the majority felt that subordinates did not share any more of their job problems with them than they had previously, nor did they feel that working relationships with peers had improved.

The evaluators concluded, based on this study, that the course definitely had a positive impact on the engineering managers and their subordinates, although there were other factors, not examined in the study, which might also have had an effect.

Schein, Virginia. An evaluation of a long term management training program. **Training and Development Journal,** 1971, **24**(12), 28-34.

Schein describes a study which attempted to assess the impact of a long-term training program upon participant interests, attitudes and personality characteristics, and to determine if predictors of these changes could be found.

TRAINING

Schein examined an eight-month management training program conducted for college graduates by the American Management Association. It had three objectives: (1) to prepare young people in philosophies, principles, skills and actual tools of management; (2) to make participants highly desirable candidates for employment in any kind of organization they wish to enter; and (3) to help participants gain intellectual maturity, emotional stability, and leadership capability more quickly than could be attained through other sources.

The course utilized instructional methods such as lectures, group discussion and films as well as programmed instruction, video tape business simulations and T-group sessions. Instructors were drawn from the ranks of practicing managers, consultants, labor leaders, government officials and educators to instruct in their respective areas of expertise. The trainees included in this study were 124 male members of the first four course offerings (1968-1969 term). All were college graduates and ranged in age from 21-31.

EVALUATION

The purposes of the evaluation were twofold: (1) to determine how the learning experience effected changes in participants' interests, attitudes and personality characteristics, and (2) to determine if predictors of these changes could be found. During the first one and one-half weeks and again eight months later, just prior to graduation, participants received a battery of varied assessment instruments. These instruments were selected to assess changes occurring in the participants attributable to training. Included were:

the Study of Values; Strong Vocational Interest Blank; Guilford-Zimmerman Temperament Survey; Leadership Opinion Questionnaire; Rotter's Internal-External Scale; and three measures designed to measure attitudes toward management—Influence Questionnaire, Public Opinion Questionnaire and a portion of the Participant Information Survey.

Further measures were administered only once during the first week to determine whether or not they could serve as potential predictors of change. These included: Adaptability Test; Otis Self Administering Test of Mental Ability; Miller Analogies Test; California Test of Personality; Edwards Personal Preference Schedule; Gordon Personal Inventory and Profile; Biographical Inventory; and a portion of the Participant Information Survey dealing with previous experience.

FINDINGS

The evaluators compared **pretest** scores with **posttest** scores on all tests and subtests of the battery. Significant change occurred on thirty-two of the seventy-four subtests administered, confirming the effectiveness of the course. Changes fell into five general areas: leadership style, attitude toward business, self confidence, need for sociability and diversity. These changes seemed to correspond roughly with the objectives of the program.

After differences in pre- and posttest scores were calculated, the potential predictors of change were compared to (**correlated** with) those measures of change which showed significant differences between pre- and posttest scores. Results revealed that predictors of these changes could be identified. Biographical indicators of change surpassed intelligence and personality factors in their ability to predict change. These findings suggest that measures of background and past experience could be used to identify those individuals most likely to benefit from this program.

Schwarz, Fred C., Stilwell, William P., and Scanlon, Burt K. Effects of management development on subordinate behavior. **Training and Development Journal**, 1968, **22**(4), 38-50; and **22**(5), 27-30.

The evaluators demonstrate how a time lag design can be used to obtain a control group when one would ordinarily not be available. They also point out the difficulties of this design.

TRAINING

A large midwestern insurance corporation developed a university based general management seminar in conjunction with the University of Wisconsin. The course had two units. The first, "Effective Executive Supervision," stressed dealings with people. The second, "The Management Process," dealt with work aspects such as planning, organizing, controlling and delegation. Each session lasted three days. Professors from the University of Wisconsin and other universities, business leaders, and consultants instructed. Workshops in which participants could test out learning were stressed. Other instructional methods employed were lectures, directed discussions, case studies, buzz groups, films, and role plays. Fifty-seven managers representing five levels of top management attended.

EVALUATION

An evaluation study was designed by university personnel to assess the impact of the course upon management **behavior** and to identify subordinate reaction to any change. The evaluators employed a special case of the **pretest-posttest control group design** called the "cycle" or time-lag design. As in the former design, the prospective trainees are divided into two groups — the **experimental** group and the control group. However, in the time-lag design both groups ultimately receive training. First both groups take the pretest, then one group is trained. Then, both groups take the posttest. Finally, the second group receives training and further comparison measures may be made. This procedure allows for the establishment of a control group without depriving anyone of training.

The prospective participants in this study were randomly divided into two groups and then trained six months apart. Group "A" started training in September 1965, and Group "B", in February 1966.

Between the two sessions, former and prospective participants were interviewed and asked to describe critical incidents in their jobs and how they handled them. No mention of, or connection to the university program was made. The critical incident portion of the evaluation measurement assessed the impact of training upon managers' behavior.

Before and after their managers were trained, subordinates completed the Leadership Behavior Description Questionnaire (LBDQ). The instrument describes the leadership practices or activities of the superior as perceived by the subordinate without assigning value judgments to the behavior. This provided an overall measure of training effectiveness.

FINDINGS

The following conclusions were derived from interview results. Group "A" showed a greater tendency to emphasize personnel events over production related events. They also placed greater emphasis on employee attitudes and had a greater concern for employee development. However, when control Group "B" mentioned personnel during interviews they spoke mainly about staffing and resolving conflicts, and had a great concern for production. The groups also differed in their methods and effectiveness of problem solving. Group "A" reported greater effectiveness through the use of higher levels of motivation, employee involvement and development; Group "B" used persuasion and salesmanship to solve problems. Group "A" also displayed more of a tendency to learn from everyday experiences.

A second comparison between the two groups was made based on the results of the subordinate questionnaire. After training, Group "A" was perceived as becoming less active, less definitive and less production-centered. Subordinates described the Group "B" managers as moving more toward structure and becoming more active. The course, therefore, had opposite effects on the two groups.

The evaluators suggested that these differences were due to the time gap, rather than the training program. Many members of both groups had daily contact with one another. Because of the interdependency of people working within the organization, the time lag design allowed the "negative" results of Group "A"'s training experience to influence the outcomes of Group "B"'s experience. The evaluators were, therefore, unable to reach any definite conclusions based on the results of this study.

Thorley, S. Evaluating an in-company management training program. **Training and Development Journal**, 1969, 23(9), 48-50.

This study examines an attempt to assess training related behavioral changes in the applied work setting.

TRAINING

Thorley describes the evaluation of a training course given to 234 managers working in a large English telecommunications company. The one week course was designed to broaden the knowledge of the managers, expose them to new ideas, and to create the sense of functional interdependence. Each day, managers received a different topic. Topics included marketing, technical manufacturing, finance, and personnel. Course speakers, for the most part, came from areas of specialization within the company. The training program took place in the company's small training center in London.

EVALUATION

The evaluator devised a questionnaire to collect from the participants possible **criteria** outside the training situation against which course success could be measured. The questionnaire was com-

pleted anonomously by participants at the close of the course. From the responses, the evaluator derived six categories: introduction of new techniques, financial control, cooperation with other functions, attitude toward job and company, staff development and decision making. To assess whether changes in behavior, skills or attitude had resulted from training, interviews with each trainee's immediate superior were arranged six months later. Each superior was given a list of his subordinates who had attended the course and asked about the performance of the group in each of the six areas.

FINDINGS

One half the superiors cited change in the specific areas of financial control, cooperation with other functions, attitude toward job and company and decision making. The other half indicated positive changes had occurred in those areas, but could not be specific. One third reported change in staff development; a quarter reported introduction of new techniques and a quarter perceived a change but couldn't be specific.

Thorley noted that there might have been some imprecision in the measurement techniques used in this study, but he believed this approach to be preferable to course ratings, speaker ratings and post courses reports. It may mean more work for the training manager, but the results obtained through this approach are directly related to the course objectives which had been derived from a perception of training needs.

Valiquet, Michael I. Individual change in a management development program. **Journal of Applied Behavioral Science,** 1968, 4(3), 313-325.

Valiquet examined participants on-the-job behavior to determine whether learning from an experimental organizational development program had resulted in changed attitudes and behavior.

TRAINING

The training program under observation was an on-going lab-type organizational development program with provision for guided on-the-job application of learning. The primary goal of the program was to optimize the company's use of its human resources and to improve collaboration in working toward common goals. To this end, participants were taught to analyze the consequences of their own actions and encouraged to consider and experiment with alternative management assumptions, attitudes, and behavioral patterns.

EVALUATION

About one year after all training had been completed, Valiquet undertook the task of evaluating the training effort. He sought to assess the impact of the program on the attitudes and behavior of the participants in terms of the stated training objectives. He did this by comparing **data** from trained and untrained managers for evidence of such changes.

Valiquet selected at **random** sixty participants from four different company locations. He selected these four because in each one, the training had begun at least one year prior to the evaluation. Trainees therefore had ample time to internalize the new values, attitudes and behavioral skills in the working environment. Also, the researcher could determine how much learning had "survived the state of early post-training euphoria" and the pressures and adversities of the work situation.[1] A **"matched** pair **control** group" was obtained by asking each **experimental subject** to nominate another manager who held an identical or almost similar functional role to the subject, but who had not participated in training.

Evaluative data was provided by "describers" who were individuals who had worked with the subject for the past year. They were selected from a mixed list of seven to ten peers, superiors and subordinates, submitted by each participant. Five describers selected randomly from each participant's list received an **open-ended** questionnaire asking the individual to describe

any specific change that had occurred since the previous year. Subjects received a similar questionnaire to elicit descriptions of their own behavior.

Describers' responses were categorized according to twenty-one content sub-categories grouped into three major categories, found to be organizationally and personally relevant in two earlier studies done by Miles[2] and Bunker[3]. Due to poor overall return rates, final results were available for only thirty-four trained subjects and fifteen controls.

FINDINGS

Statistically significant differences between the experimental and control group describers were obtained on "total number of changes observed", "total changes agreed upon by two or more observers", and "total number of changes reported by the subjects themselves". Valiquet attributes the strong positive results to the fact that the program involved inhouse training, conducted with co-workers, by company trainers. These factors facilitated the transfer of actual behavior to the work situation.

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[1]Miles, M.B. Processes and outcome. **Journal of Counseling Psychology,** 1960, 7(4), 301-306.

[2]Ibid.

[3]Bunker, D.R. Individual applications of laboratory training. **Journal of Applied Behavioral Science,** 1965, 1(2), 131-148.

Vogels, Captain David Jr. Evaluation of a management training course. **Journal of the American Society of Training Directors,** 1958, 12(1), 44-51.

Vogels used questionnaires to test the effectiveness of a combined training and organizational development program.

TRAINING

Vogels describes a management training program for first and second level supervisors in the Air Force. It was designed to improve their supervisory skills and establish two-way communications within the organization. The training course covered specific aspects of the supervisors' job, work situation improvement, productivity, problem solving, interpersonal relations, improvement of self, and employee development. Over a one year period trainees attended twenty-five two-part conferences conducted during weekly two-hour sessions. The "developmental approach" — a modified case study approach, and workshops were the dominant instructional methods.

After each conference, trainees compiled a list of job related problems and forwarded it to the course monitors. These problems were then discussed with trainees' immediate supervisors at monthly meetings held by the evaluator and management and changes were agreed upon. Infrequent meetings were held with superiors two levels above the trainees to discuss unresolved problems. These results were, in turn, fed back to the trainees' immediate superiors. Through this circuit, the evaluator hoped to help establish organizational commitment and open up two-way lines of communication throughout organizational levels.

EVALUATION

To test the effectiveness of the combined training and organizational development program, the evaluator examined trainees' and immediate supervisors' perceptions while training was still in progress. A questionnaire administered to trainees asked them how effective they thought the course was and asked them if they perceived change in their behavior at the point of questionnaire dissemination. A similar questionnaire given to immediate superiors during one of their feedback sessions asked for their feelings about the effectiveness of the training program feedback sessions.

FINDINGS

The questionnaires showed that while both the trainees and their supervisors were satisfied with the training, the trainees were not cognizant of

their superiors' satisfaction. The feedback technique has only succeeded in opening upward lines of communication, not in facilitating the downward flow. The course nonetheless was found to meet its objectives by improving supervisory skills. It was also responsible for the introduction of various management improvements.

Wexley, Kenneth N. and Nemeroff, Wayne F. Effectiveness of positive reinforcements and goals setting as methods of management development. **Journal of Applied Psychology,** 1975, **60**(4), 446-450.

The evaluators employ an experimental design to compare the effectiveness of two variations of a supervisory skills training program.

TRAINING

The objectives of the training program were to develop a more considerate, democratic style of leadership of managers working in a large urban medical center. It was hoped that through the training of managers subordinate job satisfaction could be increased and absenteeism reduced. The training program had two phases. Phase I consisted of two half-day workshops given on consecutive days. Instructors relied on role play exercises to teach those behaviors appropriate to democratic, considerate supervisors. Trainers provided specific feedback to trainees about the effectiveness of their performance. Phase II involved guided application of these techniques on the job.

Nine departments of the medical center were selected to participate in the program. All department heads were put through the training exercises in order to insure their understanding, commitment and support of the program. Twenty-seven of their immediate subordinates, three from each department, then participated in variations of the two phase program.

EVALUATION

Wexley and Nemeroff compared three different variations in the training program to determine which of these had the greatest effect on subordinate perceptions **(behavior)** and absenteeism **(results)** within the organization.

The participating managers were **randomly** assigned by department to one of two **experimental groups** or the **control group,** such that each department had the same number of managers participating in each group.

Experimental Group I received the following **treatment** or training sequence. Before each of the several role plays, the trainer discussed with the trainees a list of effective and ineffective behaviors specific to the particular exercise, Instructional staff observed the trainees' participation and then provided a "delayed appraisal" which incorporated specific feedback with reinforcement. Trainees were told how well they were doing, and how much improvement they had made. During the second phase, lasting for six weeks back on the job, trainees filled out a behavioral checklist daily, to keep a record of their performance. The trainer interviewed trainees at the end of the first and third weeks to review checked behaviors and to provide consultation on any particular problem trainees had in the application of new behaviors. During the first meeting, trainees set goals for review at the second meeting. The trainer encouraged them to set as their goals, the application of behaviors not previously checked.

Experimental Group II received the same treatment with the addition of "telecoaching," or direct reinforcement given during exercises through a device worn on the ear of the trainee. The reinforcement was immediate in nature and behavioral in context.

The control group received neither "telecoaching" nor the behavioral checklist and did not set goals for review, but otherwise experienced the same training sequence.

Sixty days after completion of the training the evaluators collected measures of managerial behavior and job satisfaction from subordinates of the trainees. Between three and six of each

manager's subordinates were randomly selected to provide information on their superior's behavior on the Leadership Behavior Description Questionnaire and two scales of job satisfaction. Absenteeism records were also examined at that time.

FINDINGS

Members of both experimental groups improved slightly more than the control group members did. The improvement was measured in terms of subordinates' perceptions of managerial behavior and of absenteeism within the organization. Improvements were accomplished without any undesired detrimental effects to the managers' ability to direct the group or emphasize production goals. The basic treatment provided to Group I was **significantly** more effective in increasing subordinate satisfaction than the treatment given Group II, featuring "telecoaching" via the ear device.

Post experimental interviews revealed complaints that the ear apparatus had disrupted the conversational flow of the role plays. In addition it contradicted the participative management style preached during training, since it only allowed for one-way communication.

Wilson, John, E. Mullen, Donald P., and Morton, Robert. Sensitivity training for individual growth—team training for organizational development. **Training and Development Journal,** 1968, **22**(1), 47-53.

Two different approaches to sensitivity training are compared to determine their relative effectiveness within the organizational setting.

TRAINING

The evaluators studied two offerings of an interagency management development course provided by the training Division of the State Personnel Board of the State of California for upper level managers in State Service. Consultants Morton and Wilson conducted both offerings. The six-day residential course emphasized interpersonal relationships and leadership skills. The first program, conducted for forty participants, in November, 1964, used the traditional sensitivity approach. The second, conducted one year later for forty-one participants, used a modified version of the Organizational Training Laboratory, an approach emphasizing team decision-making and problem-solving.

EVALUATION

Mullen, a management analyst with the State of California, conducted the evaluation. He designed a questionnaire to determine the managers' perceptions of the value of their training experience to themselves as individuals and as managers in their organizations. The questionnaire included specific questions with **scaled** responses and an **open-ended** question asking managers to cite things they were now doing that they hadn't done prior to the course, both as individuals and as managers within the organization. The questionnaires were sent out six months after the second group of managers had been trained.

FINDINGS

The authors found both courses to be of equal value to the managers as individuals. The Organizational Training Lab, however, proved superior for improvements in team work and better for interpersonal skills and problem solving.

GLOSSARY

Battery—A series of related tests administered together.

Behavior—An assessment of individual performance on the job. (See **Data.**)

Client—The person(s) or organization(s) for which an evaluation is conducted.

Control Group—A group of persons who do not participate in the training program but who are similar in all relevant respects to those who do participate. Control groups are used as a basis for comparison.

Correlation—A statistical process which shows the degree to which two or more events or objects are related to each other. In evaluations of training program effectiveness, correlations may be calculated to determine the relationships among factors effecting training results.

Criterion, Criteria—Measures of training effectiveness which reflect the goals and objectives of the training program. They provide a description or image of what should happen, thereby facilitating comparisons between what should have happened and what did happen.

Data—Factual material from which conclusions may be drawn. When evaluating training, four categories of data may be obtained: **Reaction, Learning, Behavior** and **Results.**

Design—A strategy which the evaluator uses to collect data. The design usually specifies who will be measured (**experimental group, control group**), and when they will be measured (**pretest, posttest**). The purpose of the design is to guard against the possibility that something other than the treatment causes the observed effects of the training program.

Evaluation—A deliberate process which provides specific reliable information about a selected topic, problem, or question for purposes of determining value and/or making decisions.

Experimental Design—A data collection strategy which attempts to control as many relevant and irrelevant **variables** as possible. An experimental design gains its rigor by using **control groups** and **random** selection and assignment of individuals to groups.

Experimental Group—A group of subjects who receive the experimental **treatment** in a **design.**

Forced Choice—A special kind of multiple-choice item which forces the respondent to choose the more descriptive of two or more equally attractive or un-attractive statements. This type of item is more often used in personality and attitudinal measures when social desirability of the possible responses may interfere with the selection of the alternative chosen.

Formative Evaluation—The process of judging an instructional package or process or its components during the developmental period for the purpose of providing persons directly involved with the formation of the entity with feed-back as to possible improvements. (See **Evaluation.**)

Historial Data—**Data** collected by the organization as part of its normal day-to-day functioning. It can include numerical indices such as absenteeism, turnover or production rates, and organizational documents such as agency memoranda, auditing reports, program budgets, employee rating forms, supervisor appraisals and written plans.

Hypothesis—A statement proposing a plausible relationship between two or more **variables.**

Learning—The principles, facts, skills and attitudes that participants gain from training. (See **Data.**)

Matching—A pairing of subjects on the basis of background information factors such as age, level of education or organizational status, followed by **random** assignment of one member of the pair to the **experimental group** and the other to the **control group.** This process, used when totally random selection and assignment are impossible, helps prevent the personal characteristics of the subjects from contaminating the evaluation results.

Open-ended—A question allowing respondents to answer freely in their own words rather than restricting their answers to a few stated alternatives as in a multiple-choice question. Although they are more difficult to analyze than multiple-choice questions, open-ended questions allow for a wider variety of responses.

Posttest, Postcourse or Posttraining Measurement—A measurement taken after the training program has ended. The resulting information can be used to determine whether or not trainees have achieved training objectives. If compared to a **pretest** the posttest provides a measure of change probably attributable to training.

Pretest, Precourse or Pretraining Measurement—A measurement taken before the training program begins, or during its early stages. The resulting information may be used to provide instructional designers with a picture of the skills and abilities of the average entering trainee, or may be used to give the instructor an idea of how much the group already knows relative to the learning objectives. A pretest also provides a baseline for comparison against a **posttest.**

Procedures—Instruments, devices used to obtain **data** for evaluation.

Random Assignment or Selection—The selection of cases or **subjects** in such a way that all have an equal probability of being included, and the selection of one subject has no influence on the selection of any other subject.

Rating—The process of judging someone or something according to predetermined **criteria.** (See **scale**).

Reaction—An indication of how well the trainees liked a particular program, including materials, instructors, facilities, methodology, content, etc. (See **Data.**)

Reliability—The degree to which a device or instrument (**procedure**) measures a given characteristic consistently.

Results—The impact of training on the organization or job environment. (See **Data.**)

Rigor—A term used to describe the amount of control exerted by a **design** and the consequent precision that can be attributed to the findings. The more rigorous the design, the greater is the level of confidence that one can have in the findings of an evaluation.

Sample—A subset of the population, usually selected to be representative of the whole group being studied.

Scale—A graduated continuum which allows a rater to assign numerical values ranging from low to high to a given trait or characteristic. Scales generally have between three and nine categories which may or may not have accompanying descriptive adjectives or numbers.

Significant, Statistically Significant—A statistically significant event is one that has a low likelihood of happening by chance. Significance does not mean importance; it merely means that a difference, such as the difference between the scores of two groups on a posttest, was due to some difference between the two groups rather than due to chance.

Subjects—Individuals selected to participate in any facet of a **design.**

Summative Evaluation—The process of judging a completed instructional package or process for the purpose of providing the end user with information as to its demonstrated effectiveness in a given situation. Based on this information, the user may decide to purchase the entity (if a potential user), or retain it (if a current user). (See **Evaluation.**)

Treatment—The training program or a variation in the training program given to an **experimental group** in a **design.**

Test—A series of questions, exercises or other means of measuring the knowledge, skills, abilities or aptitudes of an individual or group against selected **criteria** or norms.

Validity—The degree to which a device or instrument (**procedure**) measures what it was intended to measure.

Variable—Something that is capable of changing in value over time. One purpose of a **design** is to control for (limit the variability of) irrelevant variables so that the effect of relevant variables may be observed.

AUTHOR INDEX

Albanese, R., 1
Ashron, D., 1-2
Barnes, L. B., 2-3
Blake, R., 2-3, 3-4
Blocker, C. E., 4
Brunstetter, P. H., 5
Buchanan, P. C., 5
Bunker, D. R., 22n
Burgoyne, J. G., 5-6
Calhoon, R., 17
Gibbon, B., 1-2
Goldstein, S., 6-7
Goodacre, D. M., 7, 8
Gorman, J., 6-7
Greiner, L., 2-3
Hall, J. L., 11-12
Hand, H. H., 8-9
Hariton, T., 17-18
Hillman, H., 9-10
Ivancevich, J. M., 10-11
Jerdee, T. H., 13-14
Kirkpatrick, D. L., iii
Korman, A., 13-14
Leidecker, J. K., 11-12
McClelland, D., 12-13
Mahoney, T. A., 13-14
Maier, N. R. F., 14-15
Margulies, N., 15-16
Miles, M.B., 22n
Miner, J. B., 16
Moffie, D. J., 17
Moon, C. G., 17-18
Morton, R., 24
Mouton, J. S., 2-3, 3-4
Mullen, D. P., 24
Nemeroff, W. F., 23-24
O'Brien, J., 17
Scanlon, B. K., 19-20
Schein, E. H., 12n
Schein, V., 18-19
Schwarz, F.C., 19-20
Slocum, J. W., 8-9
Smith, B. B., 6-7
Stilwell, W. P., 19-20
Thorley, S., 20-21
Valiquet, M. I., 21-22
Vogels, D., 22-23
Wexley, K. N., 23-24
Wilson, J.E., 24

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